Installation Manual

PH3 AIR INTAKE EMERGENCY SHUT-OFF VALVE

WITH POWERGUARD SMART OVERSPEED LIMITER

AUTO ELECTRIC WITH AUTO RESET

For LTW20 / 20KW / BV-4LEZ Engines

800.663.0096

www.powerhalt.com
INSTALLATION REQUIREMENTS & RECOMMENDATIONS:

Prior to the installation, please read through the requirements and recommendations listed below so you have a clear understanding of your system and the location you plan to install the shut-off valve.

If you cannot meet these requirements, or are unsure of your system, please contact your dealer or PowerHalt representative and we can work with you to overcome your installation constraints and challenges.

A PowerHalt Technical Representative can be reached Monday-Friday 6:00-4:30 (PST) at 800.663.0096

- A 1" clearance is required from the valve to any other components. The valve can be in any orientation.
- Maximum ambient air temperature at the valve should not exceed 120°C.
- All hoses, adapters, and fittings must be suitable for the vibration of the engine application, and of reinforced type. *If unsure of your vibration requirement, contact Pacbrake.
- Flexible hose gaps should be kept to a minimum and the overall pipe quality and integrity from the shut-off valve to the intake manifold should be confirmed.

NOTE: - Failure to ensure this may result in hose collapse during valve activation and possible system leaks, preventing engine shutdown
- For excessive vibration applications, and installations with long pipe runs, additional support brackets may be required.

- If an air intake flame trap is used, the valve must be installed upstream of the trap.
- Crankcase breather connections in the intake system between the valve and engine (or in engine intake parts) must be sealed and replaced by an external breather.
- If you need to cut the existing intake piping to allow for the shut-off valve installation, please make sure to cut the pipe off of the engine and that it is cleaned thoroughly to ensure no shavings are present.

NOTE: Failure to do so may result in engine damage caused by foreign debris ingesting into the engine.

- It is highly recommended that the pipe is rolled with a bead to ensure hose fitting retention on both the inlet and outlet sides of the shut-off valve.
- If more than one shut-off valve is installed on one engine it is imperative that the control method is consistent with this requirement, ensuring valve activation is simultaneous for both valves.
KIT LAYOUT
Please ensure that you have all the parts shown in this kit before you start the installation.

KIT CONTENTS
A Air Intake Shut-Off Valve (1)
B Tie Straps (12)
C Clamps (4)
D Wiring Harness (1)
E PowerGuard Controller (1)
F Membrane Switch (1)
G 2” Silicone Hose (2)

REQUIRED TOOLS
• Drill
• ¼” Drill Bit
• Ratchet with ⅜” & ½” Sockets (a 14” extension is ideal)
• Utility Knife
• 1½” Metal Unibit
• ⅛” Hex Allen Key
Thank you for your purchase of a PowerHalt Air Intake Emergency Shut-Off Valve by Pacbrake. Please read the entire manual before you begin to ensure that you can complete the installation once started. Should you have any issues during the installation, please call technical support at 800.663.0096.

1 VALVE INSTALLATION

- Open light tower door panels on both sides.
- Remove the stock hump hose and 2 clamps from the air cleaner and intake manifold.
- Install the (2) 2" silicone hoses provided in your kit and (2) 2" pretension clamps onto the PH3 2" Shut off-valve. Adjust clamps and tighten to 70-80 in-lbs (7.9-9 N•m).
- Insert 2 stock clamps onto the valve assembly inlet and outlet ensuring clamps are loose.
- Install the valve assembly onto the intake manifold and air cleaner ensuring the valve connector is facing the intake manifold.
- Adjust the valve assembly to ensure proper valve position then tighten clamps to OEM clamp specifications.

2 POWERGUARD INSTALLATION

- Open the control panel on your LTW20 light tower.
- Use 2 self-tapping screws or 2 cap screws (not provided) to fasten the controller firmly in place on the right side of the inside of the control panel (see picture 2).
3 SWITCH INSTALLATION

- Use the layout template provided below (picture 3C) and cut out and mark drill locations for the switch to ensure accuracy. Refer to picture 3A for reference for the switch location.

**Caution:** Ensure control wiring is moved so it is not damaged during drilling (see picture 3B)

- Drill a 1 ¼" hole for the wire connector and drill two ¼" holes for fasteners (as per template layout, picture 3C).
- De-burr the holes to ensure that no wires will be damaged
- Install the switch to the panel location with the supplied button head cap screws, washers, and nuts.
- Torque the nuts on the backside of the panel of both bolts to 15-25 in-lbf (1.7-2.8) N•m.

**CAUTION:** Do not over-torque nuts.

4 MAGNETIC PICK UP INSTALLATION

- On your LTW20/BV-4LEZ light tower locate the factory installed magnetic pick connector in your control panel and disconnect from the panel connection.

5 WIRING HARNESS INSTALLATION

- Connect the wiring harness to the PowerGuard controller.
- Run the Power leads to the battery location and connect.
- Connect the tee-tap harness between the existing harness and existing connector, as per option 4 of the wiring schematic (at the end of this manual)
- Run the Valve wiring and connect to valve location.

**Note:** For detailed wiring refer to wiring schematic provided at back of this installation manual.

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**NOTE:** When printing out the drill template for use make sure your printer is not scaling the image or stretching it. Open your print dialogue box and select print at 100% scale.
POWERGUARD CONTROLLER FUNCTIONAL STATES

The PowerGuard is a smart controller and has the following three states:

STATE 1 – Pre Set-Up: When you first purchase your kit the controller does not have an RPM trip point set within its memory.
- The red and green LEDs alternately flash

STATE 2 – Normal Operation: When the controller has a stored RPM trip point, it will behave in the following way:
- When the engine is running: the green LED will flash every 5 seconds indicating the system is active and RPM is being monitored
- When the engine is not running: no LED lights will flash
- When RPM drops to zero (during normal key-off engine shutdown), the valve will perform an anti-foul cycle (closing 0.25 sec then opening) which keeps the valve free of debris and corrosion. This results in an extended valve life.
- If the valve is tripped manually or automatically, the valve will close and the red LED will illuminate. When 0 RPM is detected and 30 seconds has elapsed, the valve will automatically re-open and red LED light will go out.

STATE 3 – System Error: If there is a system error detected during the initial power-up of the PowerGuard controller, the LEDs will flash an error code as per the below sequence;
1. Rapid alternating illumination of the red and green LED lights indicates a system error
2. A one second pause is followed by a flash code where the number of flashes is the error code as per Flash Error Codes, as shown on page 7.
3. This cycle repeats until the error is fixed and the power to the controller is cycled.
FLASH ERROR CODES:

1. **Valve failed to close or motor position is not read**
   - Ensure all connectors are fully installed and latched, then cycle power
   - If this fails, ensure continuity from the five pin connector at the shut-off valve to the controller, then cycle power

2. **Valve failed to open or motor position is not read**
   - Ensure the shut-off valve connector is fully installed and latched, then cycle power

3. **Valve closes too slowly or not all the way**
   - Inspect the shut-off valve for obstructions, and attempt to manually press the flap closed and open (feeling for any binding). If the valve does not operate smoothly, contact Pacbrake support at 800.663.0096.

4. **Valve opens too slowly or not all the way**
   - Inspect the shut-off valve for obstructions, and attempt to manually press the flap closed and open (feeling for any binding). If the valve does not operate smoothly, contact Pacbrake support at 800.663.0096.

5. **Shut-off valve pulls too much current**
   - Ensure continuity from the five-pin connector at the shut-off valve to the controller on the two large power wires (red and black). Check for damage to the wires causing shorts, then cycle power.

6-9. **Internal controller error**
   - Contact Pacbrake support at 800.663.0096

### POWERGUARD SET-UP & TEST PROCEDURE

#### TO SETUP RPM:

With the engine running, hold the reset and test buttons together for 5 seconds until both LED lights start flashing, and then release both buttons

The controller is now in the set/test mode with 3 options (see below)

**FIRST:** If your controller is already set for a specific RPM, and you want to change the RPM trip point, press and hold reset for 5 seconds to remove the RPM limit, then the controller will revert to Functional State 1 (from step 6)

**SECOND:** If your controller has not been set up, pressing and releasing the RESET button will set the trip point based on number of presses, as described below

1. Press 1x = Creates a trip point at 10% over the current RPM
2. Press 2x = Creates a trip point at 20% over the current RPM
3. Press 3x = Creates a trip point at 30% over the current RPM
4. Press 4x = Creates a trip point at double the current RPM

*There must be less than 2 seconds between presses*

After presses are complete, the red LED will flash corresponding to the number of presses detected for confirmation of new trip point

If there was no RPM detected when pressing the RESET button, the controller will remove the existing RPM trip point and change to Functional State 1 (from step 6)

If no action is taken while in the set/test mode, after 60 seconds the controller will timeout and return to normal function.
8 POWERGUARD TEST PROCEDURE

TO ENTER TEST MODE:

With the engine running, hold the reset and test buttons together for 5 seconds until both LED lights start flashing, and then release both buttons.

Press and release the TEST button to enter test mode, where the trip point will be reduced to a lower limit based on number of presses from prior set-up procedure.

1. 90% of original RPM, or 82% of trip point
2. 90% of original RPM, or 75% of trip point
3. 90% of original RPM, or 69% of trip point
4. 100% of original RPM, or 50% of trip point

The controller will wait for 60 seconds before reverting back if trip point is not reached.

If the RPM trip point is reached, the valve will close and the red LED will illuminate until 0 RPM is detected and either 30 seconds elapses or the TEST button is pressed.

Next, the valve will automatically re-open and the red LED will extinguish.

9 POST INSTALLATION TESTING

Once the installation is complete, ensuring all steps, schematics and recommendations have been followed, it is now time to test your system.

1. Press the red TRIP button and confirm the red LED is illuminated. Wait 30 seconds for the valve to auto reset.
2. Start the engine.
3. Press the red TRIP button and ensure:
   • The engine stops within a few seconds
   • Hose collapse is not severe
   • No excessive leaks are present in the system

NOTE: if the engine does not fully shut down check all intake piping and hoses for leaks between the valve and intake system. If the system is sealed and the valve still fails to shut down the engine consult your Pacbrake service representative for support.

4. Once the engine stops wait 30 seconds until the valve automatically re-opens and the red LED turns off.
5. Utilize the test mode as per PowerGuard Test Procedure to ensure that the automatic overspeed is functioning properly.
10 NORMAL VALVE OPERATION

Automatic function or manual override can be used to shut down the engine during an over speed event

**CAUTION:** Do not attempt to start the engine after an over speed condition occurs until the cause is understood and shared with the necessary safety parties.

**NOTE:** Please reference your organizations specific operation procedures and ensure they are in line with the PowerHalt operating instructions and requirements. If there is a discrepancy always follow your site requirements first.

11 VALVE MAINTENANCE REQUIREMENTS

As the PH3 is a maintenance free and self-checking valve, it does not require any specific operator involvement. The PH3 performs an anti-foul cycle every time the engine comes to a stop after a period of running. However if the unit is stored for extended periods, or run for extended periods without pause, it is imperative that the engine run and shut down monthly so that the PH3 valve can perform its anti-foul cycle.

12 MONTHLY INSPECTION REQUIREMENTS

- Inspect all fasteners and clamps to ensure proper torque.
- Inspect all hoses and pipes for signs of wear or vibration related issues.
- Inspect all wiring connections and routing to ensure correct strapping.
- Inspect the PowerGuard controller with unit running to ensure the green LED light is flashing every 5 seconds.
CUSTOMER SERVICE HOURS
MONDAY TO FRIDAY FROM 6:00 AM TO 4:30 PM PST

BUSINESS HOURS OF OPERATION
MONDAY TO FRIDAY FROM 7:30 AM TO 4:00 PM PST

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